

CLAIMS

1. A color image processing apparatus of performing a color image display using a red display, a green display, a blue display and a white display, comprising:

white signal generation instrument which generates a white signal

(Formula 1)

$$W = \min(R_{in}, G_{in}, B_{in}),$$

based on an input red signal  $R_{in}$  for making said red display to be inputted, an input green signal  $G_{in}$  for making said green display to be inputted, and an input blue signal  $B_{in}$  for making said blue display to be inputted;

yellow signal generation instrument which generates a yellow signal

(Formula 2)

$$Y_e = \min(R_{in}-W, G_{in}-W),$$

based on said input red signal  $R_{in}$  to be inputted, said input green signal  $G_{in}$  to be inputted, and said generated white signal  $W$ ; and

first output white signal generation instrument which generates a first output white signal  $W_{out}^{(1)}$  for making said white display to be outputted, based on said generated white signal  $W$  and said generated yellow signal  $Y_e$ .

2. The color image processing apparatus according to claim 1, wherein said first output white signal generation instrument generates said first output white signal  $W_{out}^{(1)}$  (Formula 3)

$$W_{out}^{(1)} = W + K_1 \cdot Y_e$$

for a predetermined positive constant  $K_1$ .

3. The color image processing apparatus according to claim 1, further comprising output blue signal generation instrument which generates an output blue signal  $B_{out}$  for making said blue display to be outputted, based on said input blue signal  $B_{in}$  for making the blue display to be inputted, said generated yellow signal  $Y_e$ , and said generated white signal  $W$ .

4. The color image processing apparatus according to claim 3, wherein said output blue signal generation instrument generates said output blue signal  $B_{out}$  (Formula 4)

$$B_{out} = B_{in} - L_1 \cdot Y_e \cdot W$$

for a predetermined positive constant  $L_1$ .

5. The color image processing apparatus according to claim 1, further comprising cyan signal generation instrument which generates a cyan signal

(Formula 5)

$$Cy = \min(G_{in} - W, B_{in} - W),$$

based on said input green signal  $G_{in}$  to be inputted, said input blue signal  $B_{in}$  to be inputted, and said generated white signal  $W$ , and

second output white signal generation instrument which generates a second output white signal  $W_{out}^{(2)}$  for making said white display to be outputted, instead of said first output white signal  $W_{out}^{(1)}$ , based on said generated first output white signal  $W_{out}^{(1)}$  and said generated cyan signal  $Cy$ .

6. The color image processing apparatus according to claim 5, wherein said second output white signal generation instrument generates said second output white signal  $W_{out}^{(2)}$

(Formula 6)

$$W_{out}^{(2)} = W_{out}^{(1)} + K_2 \cdot Cy$$

for a predetermined positive constant  $K_2$ .

7. The color image processing apparatus according to claim 5, further comprising output red signal generation

instrument which generates an output red signal  $R_{out}$  for making said red display to be outputted, based on said input red signal  $R_{in}$  for making the red display to be inputted, said generated cyan signal  $Cy$ , and said generated first output white signal  $W_{out}^{(1)}$ .

8. The color image processing apparatus according to claim 7, wherein said output red signal generation instrument generates said output red signal  $R_{out}$  (Formula 7)

$$R_{out} = R_{in} - L_2 \cdot Cy \cdot W_{out}^{(1)}$$

for a predetermined positive constant  $L_2$ .

9. The color image processing apparatus according to claim 5, further comprising magenta signal generation instrument which generates a magenta signal (Formula 8)

$$Ma = \min(B_{in} - W, R_{in} - W),$$

based on said input blue signal  $B_{in}$  to be inputted, said input red signal  $R_{in}$  to be inputted, and said generated white signal  $W$ , and

third output white signal generation instrument which generates a third output white signal  $W_{out}^{(3)}$  for making said white display to be outputted, instead of said second output white signal  $W_{out}^{(2)}$ , based on said

generated second output white signal  $W_{out}^{(2)}$  and said generated magenta signal  $Ma$ .

10. The color image processing apparatus according to claim 9, wherein said third output white signal generation instrument generates said third output white signal  $W_{out}^{(3)}$  (Formula 9)

$$W_{out}^{(3)} = W_{out}^{(2)} + K_3 \cdot Ma$$

for a predetermined positive constant  $K_3$ .

11. The color image processing apparatus according to claim 9, further comprising output green signal generation instrument which generates an output green signal  $G_{out}$  for making said green display to be outputted, based on said input green signal  $G_{in}$  for making the green display to be inputted, said generated magenta signal  $Ma$ , and said generated second output white signal  $W_{out}^{(2)}$ .

12. The color image processing apparatus according to claim 11, wherein said output green signal generation instrument generates said output green signal  $G_{out}$  (Formula 10)

$$G_{out} = G_{in} - L_3 \cdot Ma \cdot W_{out}^{(2)}$$

for a predetermined positive constant  $L_3$ .

13. A color image processing method of performing a color image display using a red display, a green display, a blue display and a white display, comprising:

a white signal generation step of generating a white signal

(Formula 1)

$$W = \min(R_{in}, G_{in}, B_{in}),$$

based on an input red signal  $R_{in}$  for making said red display to be inputted, an input green signal  $G_{in}$  for making said green display to be inputted, and an input blue signal  $B_{in}$  for making said blue display to be inputted;

a yellow signal generation step of generating a yellow signal

(Formula 2)

$$Y_e = \min(R_{in} - W, G_{in} - W),$$

based on said input red signal  $R_{in}$  to be inputted, said input green signal  $G_{in}$  to be inputted, and said generated white signal  $W$ ; and

a first output white signal generation step of generating a first output white signal  $W_{out}^{(1)}$  for making said white display to be outputted, based on said generated white signal  $W$  and said generated yellow signal  $Y_e$ .

14. The color image processing method according to claim 13, further comprising an output blue signal generation

step of generating an output blue signal  $B_{out}$  for making said blue display to be outputted, based on said input blue signal  $B_{in}$  for making the blue display to be inputted, said generated yellow signal  $Y_e$ , and said generated white signal  $W$ .

15. The color image processing method according to claim 13, further comprising a cyan signal generation step of generating a cyan signal

(Formula 5)

$$Cy = \min(G_{in}-W, B_{in}-W),$$

based on said input green signal  $G_{in}$  to be inputted, said input blue signal  $B_{in}$  to be inputted, and said generated white signal  $W$ , and

a second output white signal generation step of generating a second output white signal  $W_{out}^{(2)}$  for making said white display to be outputted, instead of said first output white signal  $W_{out}^{(1)}$ , based on said generated first output white signal  $W_{out}^{(1)}$  and said generated cyan signal  $Cy$ .

16. The color image processing method according to claim 15, further comprising an output red signal generation step of generating an output red signal  $R_{out}$  for making said red display to be outputted, based on said input

red signal  $R_{in}$  for making the red display to be inputted, said generated cyan signal  $Cy$ , and said generated first output white signal  $W_{out}^{(1)}$ .

17. The color image processing method according to claim 15, further comprising a magenta signal generation step of generating a magenta signal  
(Formula 8)

$$Ma = \min(B_{in}-W, R_{in}-W),$$

based on said input blue signal  $B_{in}$  to be inputted, said input red signal  $R_{in}$  to be inputted, and said generated white signal  $W$ , and

a third output white signal generation step of generating a third output white signal  $W_{out}^{(3)}$  for making said white display to be outputted, instead of said second output white signal  $W_{out}^{(2)}$ , based on said generated second output white signal  $W_{out}^{(2)}$  and said generated magenta signal  $Ma$ .

18. The color image processing method according to claim 17, further comprising an output green signal generation step of generating an output green signal  $G_{out}$  for making said green display to be outputted, based on said input green signal  $G_{in}$  for making the green display to be inputted,

said generated magenta signal  $M_a$ , and said generated second output white signal  $W_{out}^{(2)}$ .

19. A program for enabling a computer to perform the color image processing method according to claim 13, comprising:

a white signal generation step of generating a white signal

(Formula 1)

$$W = \min(R_{in}, G_{in}, B_{in}),$$

based on an input red signal  $R_{in}$  for making said red display to be inputted, an input green signal  $G_{in}$  for making said green display to be inputted, and an input blue signal  $B_{in}$  for making said blue display to be inputted; a yellow signal generation step of generating a yellow signal (Formula 2)

$$Y_e = \min(R_{in}-W, G_{in}-W),$$

based on said input red signal  $R_{in}$  to be inputted, said input green signal  $G_{in}$  to be inputted, and said generated white signal  $W$ ; and a first output white signal generation step of generating a first output white signal  $W_{out}^{(1)}$  for making said white display to be outputted, based on said generated white signal  $W$  and said generated yellow signal  $Y_e$ .

20. A recording medium which records the program according to claim 19, and which is computer processable.